

# **CENTRIFUGAL PUMPS: PRINCIPLES, OPERATION, AND RELIABILITY**



## **OUR ACCREDITATION & PARTNERS**



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## OVERALL DESCRIPTION:

In the modern industrial environment, centrifugal pumps are the very heart of your operations. Yet, their potential to drive profitability is often overshadowed by the risks of unscheduled downtime, inefficient energy use, and soaring maintenance costs. This training is designed as a strategic investment in your operational resilience. We go beyond the standard nuts and bolts to equip your team with the expertise needed to transform your pumps from a maintenance liability into a reliable, high-performing asset. Through a blend of fundamental principles and practical, real-world applications, this course provides a clear path to improving asset longevity, optimizing energy consumption, and safeguarding your operational continuity.

## Course Objectives:

**Upon completion of this course, participants will have the knowledge and skills to:**

- Comprehend the fundamental principles of centrifugal pump operation, including hydraulic concepts and pump curves.
- Diagnose and troubleshoot common operational issues like cavitation, vibration, and overheating with confidence.
- Develop and implement effective proactive maintenance strategies to maximize pump longevity and reliability.
- Select the most suitable pump type and configuration for specific industrial applications to optimize performance and energy efficiency.
- Understand the critical role of seals, bearings, and couplings, and their impact on pump reliability.

## Course Outline:

### Centrifugal Pump Fundamentals

- Pump classifications and components
- Principles of pump hydraulics: pressure, head, and flow
- Reading and interpreting pump performance curves



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## Course Outline:

### System and Performance

- Net Positive Suction Head (NPSH) analysis and its importance
- Understanding system curves and pump operating points
- Pump efficiency and energy-saving techniques

### Operation and Maintenance Best Practices

- Proper start-up and shutdown procedures
- Lubrication and alignment essentials
- Inspection routines and preventative maintenance scheduling

### Advanced Troubleshooting and Diagnostics

- Identifying root causes of common failures (e.g., vibration, noise, leakage)
- Using diagnostic tools and techniques for effective problem-solving
- Case studies on real-world pump failures

### Components and Pump Selection

- Types and selection of mechanical seals and packing
- Bearing types, materials, and failure modes
- Strategic pump selection for reliability and total cost of ownership

## WHO SHOULD ATTEND?

Who Should Attend This course is ideal for a wide range of professionals seeking to enhance their expertise in centrifugal pump technology. This includes:

- Maintenance Engineers and Technicians
- Plant Operators and Supervisors
- Reliability Engineers
- Design and Project Engineers
- Anyone involved in the selection, installation, operation, or maintenance of industrial pumping systems.

## Course Methodology:

We utilize a variety of proven adult learning techniques to ensure maximum understanding, comprehension and retention of the information presented. This training course will be conducted as a highly interactive workshop session. A variety of training methodologies will be used Before and during the course whenever applicable. Some of these methods are gamification, online pre-post test, role plays, self-assessment instruments, group exercises & case studies.

